

Appl. No. 10/676,961
Amdt. Dated 07/08/2005
Reply to final Office action of 05/31/2005

Amendments to the Drawings:

The attached sheet of drawings includes changes to Fig. 6.

Attachment: Replacement Sheet
Annotated Sheet Showing Changes

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REMARKS/ARGUMENTS

Claims 1-30 are pending in the present application.

This Amendment is in response to the final Office Action mailed May 31, 2005. In the final Office Action, the Examiner rejected claims 2, 12, and 31 under 35 U.S.C. §112; claims 1, 2, 6-13, 17-20, 31 and 32 under 35 U.S.C. §102(e). Claims 1-2, 11-12, 17-20, and 31 have been amended. Reconsideration in light of the amendments and remarks made herein is respectfully requested.

Restriction Requirements

In the Final Office Action, the Examiner maintains the previous restriction requirement. Specifically, the Examiner contends that since Applicants clearly states that Figures 2B and 3 are different embodiments, they must correspond to different species. Applicants respectfully disagree. As explained in the previous response, the embodiment in Figure 2B has the offset distance d_2 equal to zero. The Examiner has incorrectly equated "embodiment" to "species". Applicants used the term "embodiment" in the remark section to show a variation of the design, not a "species".

Claims to be restricted to different species must be mutually exclusive. The general test as to when claims are restricted, respectively, to different species is the fact that one claim recites limitations which under the disclosure are found in a first species but not in a second, while a second claim recites limitations disclosed only for the second species and not the first. MPEP 806.04(f). Here, no such exclusive mutuality exists between the groups of claims 1, 2, 6-13, 17-20, and 31-32, and claims 3-5, and 14-16. Apparently, the Examiner contends that arrangements in one dimension and two dimensions are mutually exclusive. However, a one-dimensional arrangement is merely a special case of a two-dimensional arrangement.

The test for exclusive mutuality provided by MPEP 806.04(f) fails when applied to these two groups.

For example, claim 13 recites:

"The method of claim 11 wherein stacking comprises stacking the plurality of dies in a first stair-case configuration in a first dimension."

Claim 14 recites:

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"The method of claim 13 wherein stacking further comprises stacking the plurality of dies in a second stair-case configuration in a second dimension."

First, claim 14 is dependent on claim 13. Second, claim 13 recites a feature that stacking in the first dimension, and claim 14 further limits the feature to a second dimension. Since claim 14 depends on claim 13 and further limits the stacking feature, claim 14 does not recite "limitations disclosed only for the second species and not the first". Therefore, claims 13 and 14 are not mutually exclusive according to the test provided by MPEP 806.04(f).

Similarly, claims 2 and 3 are not mutually exclusive. The feature "attaching lower conductors to lower bond pads of the lower die at the lower first edges" is recited in both claims 2 and claim 3. (Note that the words "first" and "second" in claim 3 should have been changed to "upper" and "lower".) Since the limitations are recited in both claims and not "disclosed only for the second species and not the first," they are not mutually exclusive using the test provided by MPEP 806.04(f).

Accordingly, Applicants believe that all figures belong to the same generic species and the restriction requirement is respectfully traversed. However, in compliance with 35 U.S.C. 121, Applicants elect claims 1-2, 6-13, 17-20, and 31-32 for examination.

Rejection Under 35 U.S.C. § 112

In the Final Office Action, the Examiner rejected claims 2, 12, and 31 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Specifically, the Examiner states that it is unclear what applicant regards as "the upper and lower conductors are separated by a conductor distance" in claims 2 and 31, and "the conductors are separated by a conductor distance" in claim 12 (Final Office Action, page 3). The Examiner contends that the claims and the specification do not provide a standard for ascertaining the requisite degree of the terms, neither "sufficiently large" nor "conductor distance". Applicants respectfully disagree.

Applicants respectfully direct the Examiner's attention to the Specification, paragraphs [0021], [0028] and [0032]. The term "conductor distance" refers to a distance that is sufficiently large to separate the conductors, such as to avoid touching or crossing each other.

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Not every claim must be expressed in terms of specific numerical values; rather, the degree of precision with which the claims must be stated to meet the definiteness requirement "is a function of the nature of the subject matter." Miles Labs., 997 F.2d at 875. Thus, "the amount of detail required to be included in claims depends on the particular invention and prior art, and is not to be viewed in the abstract ..., " but in conjunction with the specifications of the patent. Shatterproof Glass, 758 F.2d at 624. Accordingly, "that some claim language may not be precise ... does not automatically render a claim invalid. When a word of degree is used the district court must determine whether the patent's specification provides some standard for measuring that degree," such that a person of ordinary skill in the art would understand what is claimed. Seattle Box Co. v. Industrial Crating & Packing, Inc., 731 F.2d 818, 826 (Fed. Cir. 1984).

In particular, the Examiner stated that the term "sufficiently large" is a relative term which renders the claim indefinite. Applicants respectfully disagree.

Several court decisions have held that the term "sufficiently large" or similar words or phrases do not render the claim indefinite. See, for example, Seattle Box Co. v. Industrial Crating Packing, 731 F.2d 818, 826, 221 USPQ 568, 573-74 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 851 (1984) ("substantially equal" is a term of degree, and that its acceptability depends on "whether one of ordinary skill in the art would understand what is claimed... in light of the specification", even if experimentation may be needed); W.L. Gore & Associates v. Garlock, Inc., No. 87-1296, 842 F.2d 1275, 1280, 6 USPQ 2d 1277, 1282 (Fed. Cir. 1988) (an "imprecise claim limitation, such as the phrase 'about 100% per second' does not impart invalidity to the claim"); Shatterproof Glass Corp. v. Libbey-Owens Ford Co., 758 F.2d 613, 624, 225 USPQ 634, 641 (Fed. Cir.), *cert. dismissed*, 474 U.S. 976 (1985) ("If the claims, read in light of the specification, reasonably apprise those skilled in the art both of the utilization and sign of the invention, and if the language is as precise as the subject matter permits, the courts can demand no more"); Andrew Corp. v. Gabriel Electronics, 847 F. 2d 819, 6 USPQ 2d 2010 (Fed. Circ. 1988) (the limitation "which produces substantially equal E and H plane illumination patterns" was definite because one of ordinary skill in the art would know what was meant by "substantially equal"). Here, the phrase "sufficiently large" indicates that the distance is sufficiently large to separate the conductors, such as to avoid touching or crossing each other. See, for example, Specification, paragraph [0021]. One of ordinary skill in the art of integrated

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circuit packaging and assembly would know what is meant by "sufficiently large" to separate the conductors.

Therefore, Applicants respectfully request the rejection under 35 U.S.C. §112 be withdrawn.

Rejection Under 35 U.S.C. § 102

In the Final Office Action, the Examiner rejected claims 1, 2, 6-12 and 17-20 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,476,474 issued to Hung ("Hung"). Applicants respectfully traverse the rejection and contend that the Examiner has not met the burden of establishing a prima facie case of anticipation.

To anticipate a claim, the reference must teach every element of a the claim. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Vergegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the...claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ 2d 1913, 1920 (Fed. Cir. 1989).

Hung discloses a dual-die package structure and method for fabricating the same. The attachment of the second die over the first die constitutes a face-to-face stacked dual die construction (Hung, col. 4, lines 8-9).

Hung does not disclose, either expressly or inherently, (1) a staggered arrangement, (2) the bottom surface of the upper die being attached to the top surface of the lower die, (3) the upper conductor and the lower conductor being separated by a conductor distance, and (4) a redistribution layer.

Hung merely discloses a dual-die packaging involving exactly two dies facing each other. Since there are only two dies, there cannot be a staggered arrangement as recited in claim 11. To clarify this aspect of the invention, claim 1 and 31 have been amended. Furthermore, the bonding wires 410 and 420 are connected to two opposite sides of the dies, not to the upper and lower first edges as recited in claim 2 and new claim 31. In addition, Hung does not disclose a redistribution layer as recited in claims 7 and 17. The Examiner states that Hung discloses depositing a redistribution layer which is a layer that contains the bond pads 210 and provides

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electrical connections between the bond pads 210 and internal elements inside the upper die 200 (Office Action, page 5, second full paragraph). However, Hung merely discloses that the die is formed with a lined array of bond pads on one edge (Hung, col. 3, lines 43-47). A lined array of bond pads is not the same as a redistribution layer.

Response to Examiner's arguments in the Final Office Action

In the Final Office Action, the Examiner contends that Hung discloses a staggered arrangement of two dice (Final Office Action, page 7). Applicants respectfully disagree. As discussed previously and repeated above, Hung merely discloses two dies facing each other. This is not a staggered arrangement which involves at least three dies. To clarify this aspect of the invention, claims 1 and 31 have been amended.

In the Final Office Action, the Examiner contends that Hung discloses a redistribution layer, citing column 3, lines 38-42 as follows:

"The first semiconductor die 100 has a circuit surface 100a and a non-circuit surface 100b, and is formed with a lined array of bond pads 110 on one edge of the circuit surface 100a thereof (only one bond pad is shown in the schematic sectional diagram of FIG.

2A)." (Hung, col. 3, lines 38-42)

However, as argued above, a lined array of bond pads is not a redistribution layer. A redistribution layer (RDL) is used to re-distribute the connections from the bond pads on the surface of the die.

The Examiner further argues that, inherently, the circuit surfaces (100a and 200a) in the upper (200) and lower (100) dies contains a circuit layer that provides electrical connections. The Examiner concludes that this inherent layer is a redistribution layer. However, the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be

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established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999). “In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.” Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). Here, Hung does not disclose a redistribution layer. The fact that there may be electrical connections between the bond pads is not sufficient to establish the inherency of a re-distribution layer.

Therefore, Applicants believe that independent claims 1, 11, and 31, and their respective dependent claims are distinguishable over the cited prior art references. Accordingly, Applicants respectfully request the rejection under 35 U.S.C. §102(c) be withdrawn.

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Conclusion

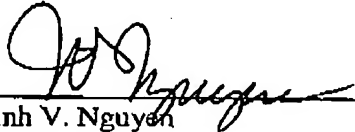
Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: July 8, 2005

By


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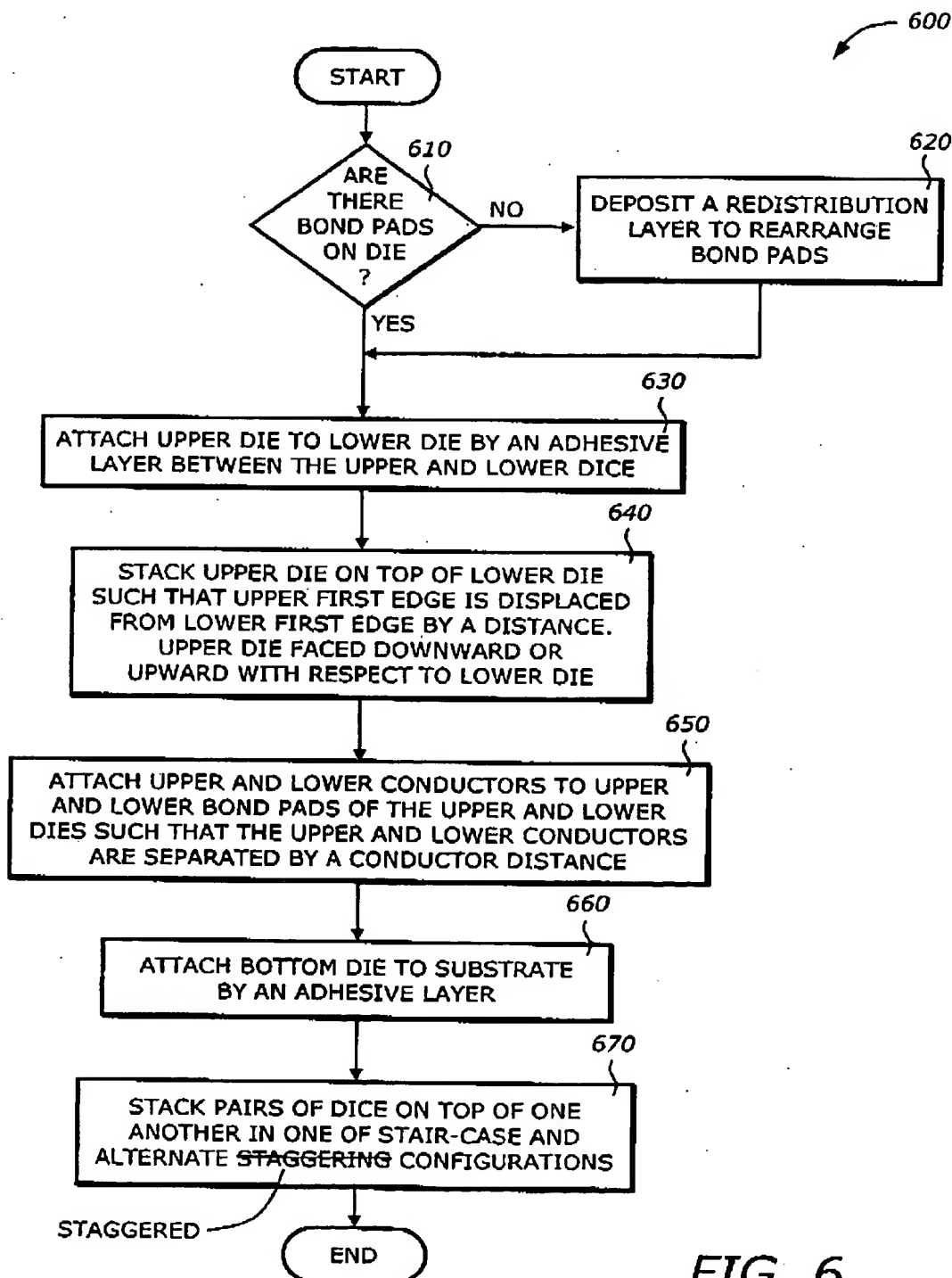


FIG. 6